charged, and is capable of inducing the phenomena of voltaism in other nerves.

" 2. This state is inducible by momentary and slight voltaic currents.

" 3. It is more inducible by the reverse than by the direct voltaic current, as stated by others.

" 4. When a nerve forms a part of the voltaic circle, new and superadded circles may be effected, which, by inducing a *change* in the condition of the first, result in the phenomena of muscular contractions.

" 5. When the voltaic circle is either complete, or, being completed, is broken, and various parts of the wires and animal tissues which form or formed that circle are *connected* by a conductor, a series of phenomena is produced, some of which still require explanation.

" 6. It is also important, especially in a medical point of view, to observe the manner and degree in which the *vis nervosa* and the *vis muscularis* are diminished by repeated voltaic action."

In conclusion the author observes, " I have purposely and carefully avoided all theoretical views, confining myself to the accurate detail of experiments. The condition induced in the nervous system by a current of voltaism I have denominated the *electrogenic*. It might be viewed as one of polarization, its discharge one of depolarization. But I have nothing to add to these views, beyond what is universally known. The phenomena of the continuous, interrupted, and sudden discharge of the electrogenic condition, have not, I believe, been traced and detailed before."

May 20, 1847.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

A paper was read, entitled "On the Nervous System of the Heart." By Robert Lee, M.D., F.R.S.

The author premises a historical notice of the various opinions entertained by distinguished anatomists respecting the nerves of the heart; some having maintained that the human heart is copiously supplied with nerves, and others that it has few or none. In September 1846, the author resolved to dissect, under the microscope, the nerves of the heart while covered with alcohol, as he had done those of the uterus. His examinations of the fœtal heart, of the heart of a child at the age of six years, of the heart of an adult in the sound state, of the human heart greatly hypertrophied, and of the heart of the ox, warrant, he thinks, the following conclusions:— 1st, that the blood-vessels and the muscular structure of the auricles and ventricles of the heart are furnished with numerous ganglia and plexuses of nerves which have hitherto been neither described nor represented by any anatomist; 2ndly, that these nervous structures of the heart, which are distributed over its surface and

throughout its walls to the lining membrane and *columnæ carneæ*, enlarge with the natural growth of the heart before birth, and during childhood and youth, until the heart has attained its full size in the adult; 3rdly, that when the walls of the auricles and ventricles are affected with hypertrophy, the ganglia and nerves of the heart are enlarged like those of the gravid uterus; and 4thly, that the ganglia and nerves which supply the left auricle and ventricle in the natural state, are more than double the size of the ganglia and nerves distributed to the right side of the heart.

The author observes that the ventricles and auricles of the human heart and of those of the hearts of the larger quadrupeds, are covered with two distinct membranes; the exterior is the serous membrane, connected by cellular tissue with another distinct tunic, which has scarcely, if at all, been noticed by anatomists. This second membrane is stated to have a dense fibrous structure, to be semitransparent, and to resemble in a remarkable manner the aponeurotic expansions, or fasciæ, covering muscles in other parts of the body; and, like them, it sends numerous fibres or processes between the muscular fasciculi, blood-vessels, nerves, and adipose substance of the heart. This membrane, the author thinks, may appropriately be termed the *cardiac fascia*, and he states that, through this, after the removal of the serous membrane, there are numerous ganglia and plexuses of nerves visible to the naked eye. If these nerves be traced backwards towards the base of the ventricles, they are seen to terminate in a great ganglionic plexus, situated between the pulmonary artery and aorta; into which plexus branches of nerves enter from the par vagum of each side, the recurrent and the sympathetic nerves. From this great ganglionic plexus, which the author considers to be the root of all the principal cardiac nerves, branches invested with a soft neurilema proceed to the auricles and ventricles, and their septa. Large flat branches of nerves pass from this ganglionic mass to the coronary arteries, the trunks of which they completely surround like a sheath, and all the ramifications of which they accompany, not only over the surface of the heart, but into the muscular substance, and they are distributed with these arteries throughout its walls to the lining membrane. The author also states that there are besides numerous branches of nerves from the great ganglionic plexuses at the base of the heart and surrounding the coronary arteries, with ganglia distributed over the surfaces of both the ventricles, which do not accompany the blood-vessels, but run obliquely across them, and also across the fibres of the muscular coat. These superficial cardiac nerves are described as being remarkably soft, flat, of a grey colour, and somewhat transparent, as had been formerly stated by Scarpa. Towards the left side and apex of the left ventricle, these nerves lie in grooves or depressions of the muscular coat, and spread out into ganglionic enlargements, from which innumerable filaments are sent off laterally to the muscular coat. There are ganglia of considerable size on these superficial nerves where they are crossing the arteries, which send branches to the coats of the vessels, and some of which branches pass down with the vessels into the substance of the heart.

Reference is made to three drawings intended to accompany the paper, but the first of these drawings only was received with the paper.

June 3, 1847.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

The Right Hon. Viscount Morpeth was elected into the Society.

A paper was read, entitled "On a Function of the Red Corpuscles of the Blood, and on the Process of Arterialization." By George Owen Rees, M.D., F.R.S. &c.

The author states that he was first led to the new theory he has formed for the explanation of the chemical phenomena of respiration, and more especially of the change in the colour of the blood which occurs in that process, by having observed that a garlick odour, similar to that evolved from phosphorus, was produced by agitating in distilled water the clot obtained from some specimens of venous blood. His attention was consequently directed to the investigation of the state in which the phosphorus exists in the blood; and the result of that investigation was the theory, of which the following is a succinct outline.

The venous corpuscles are known to contain fat in combination with phosphorus. This compound ingredient of the corpuscles, on coming into contact with atmospheric oxygen during the respiratory act, is consumed, and combining with that oxygen, forms the carbonic acid and water which are expired, and also phosphoric acid, which, uniting with the alkali of the liquor sanguinis, forms a tribasic phosphate of soda. This salt, like many others, acts upon hæmatosine in such a manner as to produce the well-known bright arterial tint.

The analyses which the author has performed in order to test the correctness of this theory were made upon the blood, both of the veins and of the arteries of the same animal; and also upon separated portions of the same venous blood; one of which portions had been artificially arterialized by having been brought into contact with air, while the other portion had not been so exposed. These comparative experiments showed that arterial blood, both when obtained from the vessels and when artificially produced, contains in its serum a larger proportion of tribasic phosphate of soda than that obtained from the veins. The venous corpuscles, as they are contained in the clot, yield a fatty matter combined with phosphorus; while those from arterial blood yield a fat, the ashes of which manifest an alkaline reaction. Thus the venous corpuscles are shown to be acted upon both by respiration and by the artificial arterialization of the blood, in such a manner as to lead to the formation of tribasic phosphate of soda at the expense of the phosphorus they contain.